

MAGNETIC BEHAVIOUR IN ERBIUM DOPED PHOSPHATE GLASS EMBEDDED WITH COBALT NANOPARTICLES

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ABSTRACT

Considerable interest on magnetic nanoparticles (NPs) embedded rare earth doped glasses are expanding rapidly. A series of Er^{3+} doped phosphate glass with the composition of $(69-x)\text{P}_2\text{O}_5-10\text{MgO}-20\text{ZnCl}_2-1\text{Er}_2\text{O}_3\cdot(x)\text{CoO}$ with $0 \leq x \leq 2.0$ mol% embedded with CoO NPs are prepared using melt quenching method and the influence of CoO NPs on the glass samples are examined. Samples are characterized using X-ray diffraction (XRD) which reveals the amorphous nature of the glass. The physical and magnetic properties were investigated. The samples showed magnetic behavior, with magnetization increased with increasing the CoO concentration but decreased at 1.5% concentration. Saturation Magnetization (M_r), Remanent Magnetization (M_r), Coercivity (H_c) and Squareness (M_r/M_s) of the samples are also determined. According to the results obtained, which closely correlates with the CoO content, the glasses can be classified as antiferromagnetic.

Keywords: Phosphate glass; cobalt nanoparticles; magnetic properties;

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